

The only genus of the above, in which the structure of the feet is well known, is *Phenacodus*. It is partially known in *Catathlæus*.

The only genus of *Meniscotheriidæ* is distinguished as follows :

Inferior premolars consisting of two *Vs*.

*Meniscotherium*.

*Variation in the Nest Forms of the Furrow Spider, Epeira strix*.—Rev. Dr. H. C. McCook remarked that he had observed that some of the orbweaving spiders had a marked tendency to vary the forms of their nests. The spinning work of spiders may be classified as (1), the *snare*, spun for the capture of prey; (2), the *enswathment*, by which insects are disarmed and prepared for food; (3), the *gossamer*, used for purposes of aqueous or aerial locomotion; (4), the *cocoon*, spun for the propagation and protection of the species; and (5), the *nest*, which is a domicile more or less elaborate and permanent, within or under which the araneid dwells for protection against enemies and weather changes. As a rule, the great groups of Orbweavers differ from each other and agree within themselves in the characteristic form of nest. The form prevailing in each family is substantially the same; each species appears to adhere quite steadily to one characteristic form; but there are some marked variations in the habit of certain species, the most decided of which have been observed in the case of *Epeira strix*. Some examples of this were given.

1. The ordinary nest of *Strix* when domiciled in the open field or wood, is a rolled leaf. A single leaf is taken, the edge pulled up, drawn under and fastened by adhesive threads into a rude cylinder, within which the spider hides during the day-time. A thread connection with the foundation lines of the snare is maintained; but rarely with the centre of the orb by a taut trap-line as is the habit of the Insular spider, *Epeira insularis*.

2. A second form of nest varies from the rolled leaf nest, in having the edges of two adjacent leaves bent towards each other and lashed together on the exterior at the juncture by silken cords, and on the interior by adhesive tissue-web. An oval opening is left at the united points of the leaves, through which the connecting line passes to the snare. The spider domiciles within the leafy cavern thus formed.

3. Again, the spider avails herself of small holes in wood or stone, openings in fences, the interspace between curled bark on the trunk of old trees, or some like cavity, which she appropriates as a nesting-place. A slight lining will generally be found upon the concave surface. Dr. McCook had noticed that in such cases the snare is sometimes diverted from its normal shape in order to give a convenient approach thereto from the den. One such example was found spun between a side of the Peace Fountain in Fairmount Park (Philadelphia) and the stone wall adjoining.

In order to pitch her tent within a hole in the rock, the spider diverted one of the radii from the plane of the orb and extended it backward to the hole. The spirals which passed over this radius thus made an elbow or angle, which was indeed nearly a right angle, and gave the orb an odd, broken appearance. The radius, of course, served as the bridge-line by which *Strix* passed from her den to her snare.

4. Another variation was due to an accident in the environment of the web. A half-grown *Strix* had woven a snare in the hollow of a decayed tree (at New Lisbon, Ohio), within two feet of the ground. A colony of the Pennsylvania carpenter ant (*Camponotus Pennsylvanicus*) had quarters in the tree, a squad of black workers were busy excavating their wooden galleries. These dumped their chippings from openings just above the spider's orb, whose viscid spirals retained goodly quantities of the brown sawdust. In course of time a ball of chippings as big as a walnut had accumulated, or, perhaps had been purposely massed by the spider. However that may be, the ball was utilized as a nest; its centre had been pierced, a spherical cavity formed by silk-lining the interior, which was entered by a circular door bound around the edge by spinning-work. This quaint domicile was pendant from one of the strong upper foundation lines, and herein *Strix* rested, while the emmet carpenters worked away above her, continually dropped chips upon the roof of her den, and the orb beneath, until one side of the snare was quite covered with them. In this case the position of the nest, as well as its form was exceptional, as the nest site of *Strix* is well nigh invariably beyond the limits of the web, sometimes, indeed, several feet. In these points the spider was evidently led to an intelligent variation of her nest-building by circumstances.

5. Another variation, or rather a series of variations, was noted upon the side of Brush Mountain at Bellwood, Pennsylvania. Several young pine-trees had been cut away and tossed from the mountain to the banks of the Juniata River below. The foliage had withered and fallen from the boughs, whose branches stretched out dry and bare, and among them a colony of young furrow spiders had pitched their tents and spread their snares. One specimen happened to spin her web near the axil of several goodly sized branches, which were formed into a natural shelter by the inverted position of the bough. The spider had recognized this vantage, and made her nest at the point of juncture, or rather took shelter there, for there was very little artificial nesting beyond a faint tissue spread over the bark at the point where she sat.

A second specimen had lodged at a point near the tip of a small branch whose delicate dry twigs gave no sufficient shelter, and besides, were directed upward. Accordingly a silken tube, funnel-shaped, was spun between the twigs, within which young *Strix* nested.

A third spider lodged in a similar site, had made a silken sack for a tent, whose mouth had apparently originally opened directly toward the snare. But a saltigrade spider had fastened a parasitic tubular nest upon one side of this sack, and accordingly the mouth was found closed and the door shifted to the opposite side, as though to avoid interference with a troublesome neighbor.

A fourth individual had woven a simple silken cover or screen, behind which she lodged. A fifth had pitched her tent upon a stray leaf beneath which a similar cover, a small rectangular piece of silk canvas (suggestive of the military bivouac or "dog tent") was stretched by lines attached to the sides and corners, and fastened to the leaf surfaces and surroundings. Between this sheet and the leaf the spider was ensconced having the usual bridge-line connection with the orb.

6. Two of the above colony had established nests in tufts of a parasitic moss fastened upon the dead limbs. One of these was very pretty and ingenious. The moss grew in a bunch about the size of a hickory-nut; this was pierced at the top, and the filaments pushed aside sufficiently to allow an interior cavity large enough to house a spider. An oval door or opening was formed near the top by bending and binding back the fibres of the plant. A secure and tasteful retreat was thus obtained at the only really available spot in the vicinity of the snare.

7. When the furrow spider weaves her orb upon the exposed surfaces of human habitations, as the cornices of porches, out-houses, etc., her nest takes a form quite different from any of the above. A tube of stiff silken fibre is spun against the surface to which it is lashed at all sides. This cylinder is about an inch long and half-an-inch thick, and at the end toward the orb has a circular opening about a quarter of an inch in diameter. The stiff texture of the nest appears to be necessary to make the walls self-supporting, inasmuch as there are no supports like the twigs and leaves found at hand in arboreal sites. Moreover, the open position of the domicile exposes the spider very freely to the assaults of the mud-daubers who frequent such localities, to birds and other enemies, so that a canvas is needed of tougher texture than that required in sheltered sites. It may be remarked that in old buildings, which present cracks and crannies convenient for nesting, woven nests of this sort will rarely be found.

It is thus seen that while there is a general regard to protection of the spider's person, there is a modification over a quite wide degree of variation in the form of the protective nest. Further, that this modification appears to be regulated more or less, by the accidental environment of the domicile, and in such wise as to show no small degree of intelligence in adapting the ordinary spinning habit to various circumstances, and to economizing labor and material.